ABSTRACT

A method for producing a semiconductor device is disclosed that is capable of improving device isolation capability of a device isolation film, and enables effective formation of gate insulating films having different film thicknesses. This method can be used in fabricating a semiconductor device having non-volatile memories with logic elements embedded. As one embodiment, a substrate protection film is formed on a silicon substrate, then an oxide film is formed in a flash cell region with a logic region being covered by the substrate protection film. Next, in the logic region, an intermediate oxide film is formed in a thick film region of the logic region with a thin film region of the logic region being covered by the substrate protection film. Then, the substrate protection film in the thin film region of the logic region is removed, and an oxide film is formed therein. At the same time, the oxide film already in the thick film region is oxidized again, and this results in a thicker oxide film in the thick film region.